

## VEHICLE WITH A RAMP FOR A WHEELCHAIR

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## BACKGROUND AND SUMMARY OF THE INVENTION

[0001] The invention relates to a vehicle with a ramp for a wheelchair that can be lowered about a pivotal connection point arranged at the outside of the floor section, out of its lowered position, in which the ramp is accommodated by a floor section lowered relative to the vehicle floor and forms one surface with the vehicle floor, towards the roadway to assist the movement of a person in a wheelchair, once an associated door has been opened.

[0002] In the last few years vehicles referred to as high-capacity sedans or as vans have become increasingly popular with customers. Compared with conventional passenger vehicles, this type of vehicle offers a larger and more versatile interior and comparable performance and it is therefore increasingly also being used to carry people in wheelchairs. To maintain the required headroom in this case, it is customary to form a step in the vehicle floor in the area where the wheelchair is to be located, this generally being achieved by means of a wedge-shaped opening in the rear area of the vehicle, for example.

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[0003] A ramp is attached in a known manner to the now lower loading edge by means of a hinge joint, this ramp being secured upright on the inside in front of the associated door and being extended towards the roadway to assist the movement of the person in the wheelchair into the vehicle. If no wheelchair is being carried, the ramp remains in its upright position and the vehicle can thus be identified as a vehicle for disabled persons, sometimes leading to problems with the acceptability of such vehicles among people who are not disabled. If a vehicle equipped in this way is used as an ordinary means of transport and is used to take cargo, there are difficulties with loading and unloading because the ramp has to be operated. Moreover, the utilisation of space is not ideal owing to the discontinuity in the vehicle floor due to the lowered load surface.

[0004] GB 2 306 152 A has disclosed the provision, especially in the case of low-floor buses, of a wedge-shaped floor section that slopes outwards and downwards in a door area and pivotally connected to which, on the door side, is a likewise wedge-shaped ramp that can be moved from its extended position, in which it is supported on the roadway, into its retracted position, in which the ramp forms one surface with the vehicle floor. This provides a good means of entry and exit for a person in a wheelchair, whose wheelchair is accommodated by a floor area adjoining the ramp to keep the ramp free for an unhindered

further sequence of motion. Utilisation of space in this way is acceptable in a low-floor bus but is not acceptable in a high-capacity sedans because of its relatively small floor area.

[0005] It is the object of the invention to design and arrange the ramp in such a way that the vehicle cannot be identified as a vehicle for handicapped persons when no wheelchair is being carried and, at the same time, loading and unloading is made considerably easier while achieving good utilisation of space.

[0006] This object is achieved by a vehicle with a ramp for a wheelchair that can be swung out of its lowered position towards the roadway to assist the movement of a person in a wheelchair, the ramp pivots about a pivotal connection point arranged at the outside of floor section from a position in which the ramp forms one surface with the vehicle floor and is accommodated by the floor section, which is lower relative to the vehicle floor, to the roadway once an associated door has been opened. The lower floor section serves as a load surface for the wheelchair, and the ramp remains in a secured upright position when the floor section is occupied by the wheelchair.

[0007] In a preferred exemplary embodiment of the invention, the ramp is connected to the vehicle by means of at least one vertically displaceable pivot mounting. The cavity that remains

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underneath the ramp when the latter is raised can be used as additional storage space.

[0008] In another preferred exemplary embodiment of the invention, the ramp has two moveable sections, which are connected to one another by at least one hinge. In this arrangement, the first section is connected pivotably to the vehicle at a fixed location, while the second section can be swung down towards the vehicle floor.

[0009] To prevent the ramp being lowered unintentionally, the hinge action can be blocked when the ramp is in the raised condition.

[0010] The cancellation of the hinge action can be brought about by means of locking means in the form of belt-latch mechanisms.

[0011] The subject matter of the invention is explained in greater detail below with reference to two exemplary embodiments.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Fig. 1 shows a first exemplary embodiment with a one-piece ramp that has been extended,

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[0013] Fig. 2 shows the position of the ramp when no wheelchair is being carried,

[0014] Fig. 3 shows a second exemplary embodiment with a two-piece ramp that has been extended,

[0015] Fig. 4 shows the position of the ramp when a wheelchair is being carried, and

[0016] Fig. 5 shows the position of the ramp when not carrying a wheelchair.

DETAILED DESCRIPTION OF THE DRAWINGS

[0017] According to Fig. 1, which shows a vehicle 1 in the form of a high-capacity sedan, the rear side 2 of which can be closed by means of a rear door (not shown), the vehicle floor 3 has an offset floor section 4, which forms a flat surface extending as far as the rear of the vehicle 1 and serves as a load surface for a wheelchair. The rear door can be swung open upwards or to the side and can also be of two-piece design with lateral pivoting axes. It would also be possible to provide access at the side via a door that can be pivoted in the same way or via a sliding door, which is adjoined by the floor section 4.

[0018] Connected pivotally to the outer end 5 of the floor section 4 is a ramp 6. This can be accomplished by means of hinges 7, as indicated, only one of which is visible, forming part of a pivot mounting 8. This pivot mounting 8 is guided in a vertically displaceable manner in a rail 9 and can be fixed at least in its upper position. The ramp 6 has upright side rails 10 and a gripping slot 11.

[0019] The extended ramp 6 shown in Fig. 1 rests by its free end 12 on the roadway, allowing a wheelchair to be moved in the direction of the floor section 4 via the oblique plane thus created and to be fixed on the said surface. Once the wheelchair is in its correct location, the ramp 6 is raised and fixed in a known manner in the raised position, it being possible to achieve this, for example, by means of bolts (not shown). The rear door (likewise not shown), which is designed to match the rear opening, can now be closed.

[0020] When the person in the wheelchair leaves the vehicle 1 via the ramp 6, which is lowered as shown in Fig. 1, the said ramp can be raised by means of the pivot mountings 8, which are vertically displaceable in the rails 9, and then swung towards the vehicle floor 3, resulting in a continuous flat surface together with the vehicle floor 3 in the lowered position of the ramp 6, allowing advantageous loading of the vehicle 1. This

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position of the ramp 6 can be seen from Fig. 2, which likewise shows that the storage space 13 formed between the ramp 6 and the floor section 4 can be used for storing items that can be pushed in.

[0021] In the exemplary embodiment shown in Figs 3-5, the ramp 6 has two moveable sections 14 and 15, which are connected to one another by hinges 16. The first, shorter, section 14 is likewise connected pivotably to the vehicle 1 at a fixed location, via hinges 17, while the second, longer, section 15 can be swung towards the vehicle floor 3. To raise the ramp 6, the two sections 14 and 15 are moved into an extended position, the hinge action between the two sections 14 and 15 being cancelled by the interengagement of locking means 18, which, according to Fig. 4, are designed as belt-latch mechanisms 19. It would, of course, also be possible to achieve locking by means of bolts.

[0022] If the intention is to cover the floor section 4 when not carrying a wheelchair, the ramp 6 is moved towards the vehicle floor 3, the two sections 14 and 15 of the ramp 6 pivoting about the axis of the hinges 16 and 17 during this process and giving the arrangement shown in Fig. 5 at the end of the pivoting operation. Here, the shorter section 14 rises from the floor section 4 as far as the level of the vehicle floor 3, and the longer section 15 covers the floor section 4, the lowered

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position being secured by engagement in retaining means (not shown) as section 15 is lowered towards the vehicle floor 3, section 15 being released automatically again as it is raised.

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